特种计算机

Industrial Computer

产品说明书

User Manual

MEC-5005 SERIES

低功耗无风扇嵌入式整机

Low-power Fanless Embedded PC

Version: C01

Legal Information

Warnings

Please pay attention to the tips within the manual so as to avoid personal injury or property losses. The tips for personal injury are indicated in warning triangles while the tips only related to property losses have no warning triangles. The warning tips are listed as follows with the hazardous scale from severe to slight.

⚠ **Danger**
If handled carelessly, death or severe human injury will occur.

⚠ **Warning**
If handled carelessly, death or severe human injury might occur.

⚠ **Caution**
Warning triangle indicates that slight human injury might occur if handled carelessly.

Note
Unexpected result or status might occur, if not handled according to the tips.

Professional Personnel

The product/system covered by the manual can only be handled by qualified and professional personnel. During operation, please follow the respective instructive manuals, especially the safety warnings. The professional personnel have been trained and possess relevant experiences; therefore, he/she could be aware of the risks of the product/system and avoid possible damages.

EVOC Product

Please pay attention to the following instructions:

⚠ **Warning**
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Warranty Terms:

The warranty on the product lasts for one year. If the user has additional requirements, the contract signed between the two sides shall prevail.

Please visit our website: http://www.evoc.com for more information,
or send an email to the Technical Support Mailbox support@evoc.com (International) or support@evoc.cn (Domestic) for consultation.

Hotline: 4008809666

About this manual

Scope of the Manual

The manual is appropriate for EVOC MEC-5005 SERIES.

Convention

The term “the PC” or “the Product” within the manual usually stands for EVOC MEC-5005 SERIES products.

Instructions

Safety instructions

To avoid property losses or individual injury, please pay attention to the safety instructions within the manual. The warnings within the manual are marked with warning triangle , whose existence is dependent upon the scale of the potential hazard.

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1. Product Introduction

1.1 Overview

MEC-5005 is a high performance low power fanless embedded PC. The product features al-alloy chassis, small form factor, compact and rugged structure, as well as fanless design. The PC dissipates heat from the chassis, and provides excellent dust-proof, heat dissipation and anti-vibration performance. Tailored for application in harsh environments with heavy contamination, dust and serious EMI, the product can be used in a wide range of embedded fields, such as mechanical equipment, intelligent transportation and industrial automation control.

1.2 Specifications

Item		Definition
Main Functional Index	**Microprocessor**	Intel ATOM D510 1.66G/D410 1.66G
	Chipset	ATOM D510/D410+ICH8M
	Memory	2G DDR2 memory as standard configuration. The motherboard is configured with one DDR2 SO-DIMM memory slot, supporting up to 2GB memory capacity.
	Display	● 1 x VGA port ● 1 x LVDS port (routed from DVI-I connector)
	Network	Provides two 10/100/1000Mbps Ethernet ports.
	Audio	One group of audio ports, supporting MIC-in, Line-in, Line-out.

	Expansion bus	● Expandable to two PCI cards; supports 106.7mm (height), 174.6mm(length); compatible with 2.3 standard; ● Expandable to two Mini PCI-E x1 slots.
	External IO ports	● 6 x USB2.0 port; ● One group of AUDIO connectors, supporting MIC-in, Line-in, Line-out; ● 4 x COM port (realized through DB44 connector); COM1, COM2 are RS-232/ RS-422/RS-485 (support automatic flow control); COM3, COM4 are RS-232; ● 1 x 8-channel digital I/O port (via D-SUB 9 female connector); ● 1 x LPT port; ● 1 x VGA port; ● 1 x LVDS port (routed via DVI-I connector); ● 2 x 10/100/1000Mbps Ethernet port.
Main Functional Index	**Dimensions (Excluding mounting ear)**	241.9mm(W) x 106.3mm(H) x 255mm(D)
	Net weight	5.85Kg
	Temperature	● Operating temperature: Configuration with monitoring level HDD: -5℃~50℃; Configuration with commercial grade HDD: -5℃~40℃; ● Storage temperature: -30℃～65℃

	Humidity	5%～95% (Non-condensing)
	EMC	● Limits of radio disturbance are compliant with GB9254-2008, class A; ● Limits of immunity are compliant with the threshold of GB/T 17618-1998 standard.
	Reliability	● MTBF≥50000h; ● MTTR≤0.5h.
	Safety	Meets basic requirements of GB4943.
	Mechanical and environmental adaptability	● Anti-vibration: 5-19Hz/1.0mm amplitude; 19-200Hz/1.0g acceleration; ● Anti-shock: 10g acceleration, 11ms duration.
	Power	● Input voltage/frequency: 220VAC/50Hz (when equipped with power adapter); Input voltage/current: 9～30VDC; (no power adapter) ● Power consumption of the PC: 18W (standby); Power consumption of the PC: 25W (operating MaxPower 100%).

2. Application Scheme

2.1 Transportation

Well-packaged products are suited for transportation by all kinds of vehicles. During transportation, products should not be put in open cabin or carriage. During transshipping, products should not be stored in open air without protection from the atmospheric conditions. Products should not be transported together with inflammable, explosive and corrosive substances and are not allowed to be exposed to rain, snow and liquid substances and mechanical force.

2.2 Storage

Products should be stored in package box when it is not used. And warehouse temperature should be 0°C ~ 40°C, and relative humidity should be 20% ~ 85%. In the warehouse, there should be no harmful gas, inflammable, explosive products, and corrosive chemical products, and strong mechanical vibration, shock and strong magnetic field interference. The package box should be at least 10cm above ground, and 50cm away from wall, thermal source, window and air inlet.

Caution!
Risk of destroying the device! **When shipping the PC in cold weather, please pay attention to the extreme temperature variation. Under this circumstance, please make sure no water drop (condensation) is formed on the surface or interior of the device. If condensation is formed on the device, please wait for over twelve hours before connecting the device.**

2.3 Opening the Box and Initial Examination

Opening the Box

Please pay attention to the following issues when opening the box:

- Do not discard the original packing material. Please keep the original packing material for re-transportation.
- Please keep the documentation at a safe place. The documentation, which is a part of the device, is required for initial device debugging.
- When doing the initial examination, please check whether there are distinct damages to the device caused during the transport.
- Please check whether the delivery contains the intact device and all of the independently ordered accessories. Please contact the customer service when any unconformity or transportation damages occur.

3. Installation Instructions

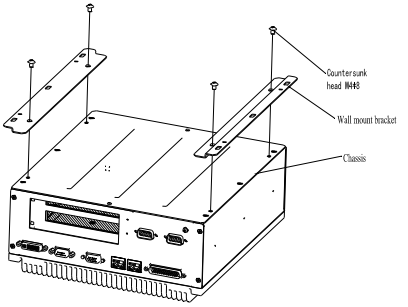
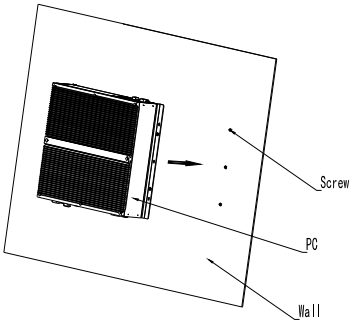
3.1 Mounting Mode

□19″ Rack Mount ■Desktop □Embedded Panel

■Wall Mount □VESA Standard Arm □Portable

□Others_____

3.1.1 Wall Mount Installation

<table>
<tr><td rowspan="2"> 
</td><td>Step 1: As shown in the left figure, use 4pcs screws (spec.: countersunk head M4*8) to fix the installation bracket onto the PC..</td></tr>
<tr><td>Note: The installation bracket and the screws used are the accessories of the PC.</td></tr>
<tr><td rowspan="2"> 
</td><td>Step 2: Put up the PC on the wall by the already installed screws.</td></tr>
<tr><td>Note: The installation requirements are as follows:</td></tr>
</table>

Material	Hole diameter	Installation
Cement	Diameter: 8mm Depth: 60mm	Peg: Diameter: 8 mm; Length: 50 mm

		Screw: Diameter: 4 mm; Length: 50 mm
Plaster board (minimum thickness: 13mm)	Diameter: 14mm	Plaster support: Diameter: 4 mm Length: 50 mm
Metal (minimum thickness: 2mm)	Diameter: 5mm	Metal screw M 4: Diameter: 4 mm Length: 15 mm

⚠**Warning**
Please make sure the wall or ceiling shall be able to support at least four times the total weight of the PC. (including cabinet bracket and additional expansion modules)

3.2 Explanation of Environment of Fully-enclosed Computer

Dissipation methods of fully-enclosed computer: thermal conduction and thermal radiation methods are deployed to dissipate heat generated by internal components to the chassis, which in turn passes the heat to the external space by thermal radiation and convection. The inside of the chassis, the chassis and the space where the computer is located exchange heat with each other continuously and sufficiently. The requirements for the working area or space where the PC is located are as follows:

The largest dimension of the fully-enclosed PC is L, the gravity direction is Y, the upper space of the PC is +Y, while the lower space of the PC is –Y, as shown in the Figure 1 and Figure 2 below.

1. Upper space +Y > 2L: above the PC, there should be a space at least twice the largest dimension of the PC;

2. Low space -Y > L: below the PC, there should be a space at least the same size as the largest dimension of the PC;

3. There should be at least 0.5L space for the other four directions (front, rear, left, right);

4. In the above heat exchange areas, there should be no other heat generating object or space divider, and no other article is allowed to be placed on the surface of chassis;

5. There should be heat exchange channel between heat exchange area and outside natural environment, such as air moving equipment, and air inlet/outlet to ensure air circulation, etc.;

6. The temperature of lower space (20～50mm from the bottom of the PC) should be no more than the rated operating environment temperature of the PC;

7. At any point in the heat exchange area, the air flow speed should not be lower than 0.2m/s.

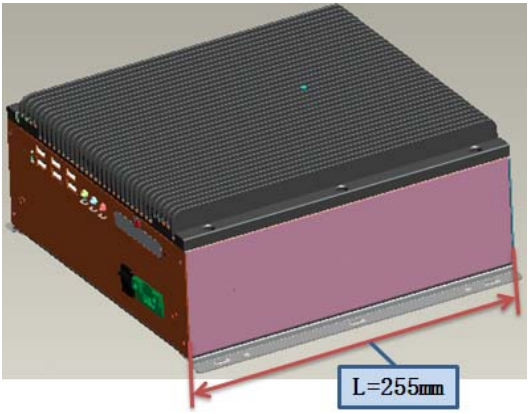


Figure 1 Largest dimensions of the PC

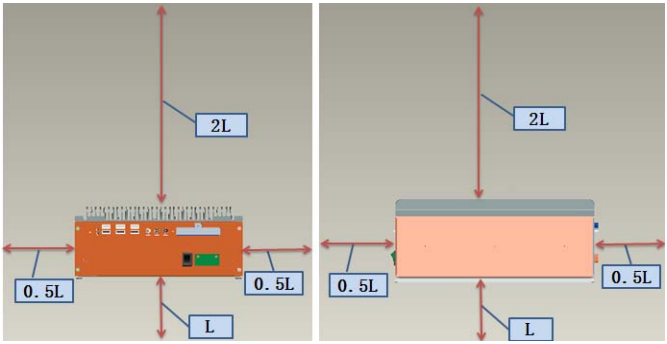


Figure 2 Heat exchange area

During the installation, the heat sink fin on the chassis should be in the same direction of ventilation inside the chassis to ensure better heat dissipation effect. Two ventilation methods are recommended, as shown in the Figure 3 and Figure 4.

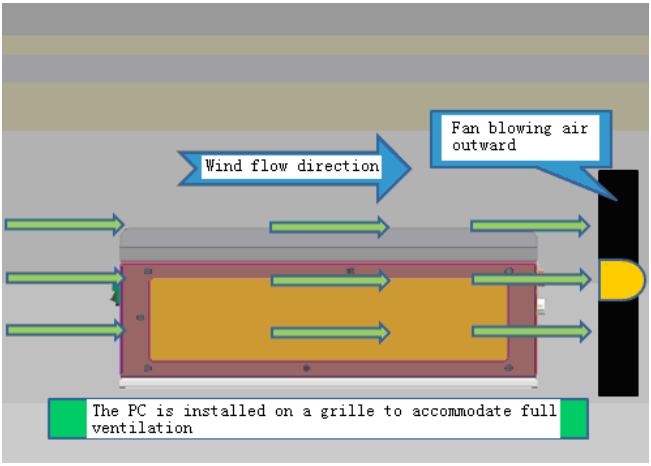


Figure 3 Left-right horizontal ventilation

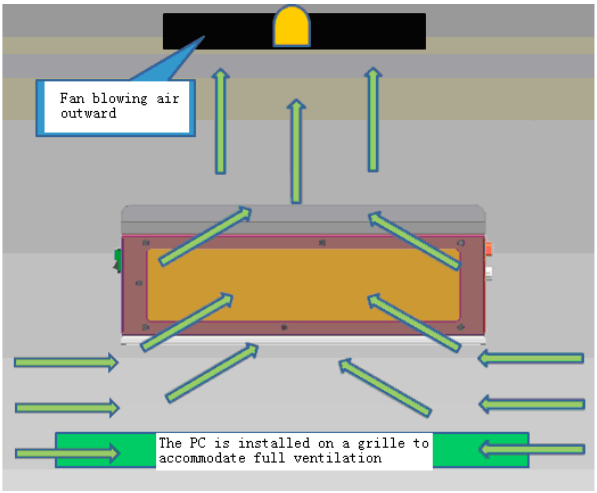
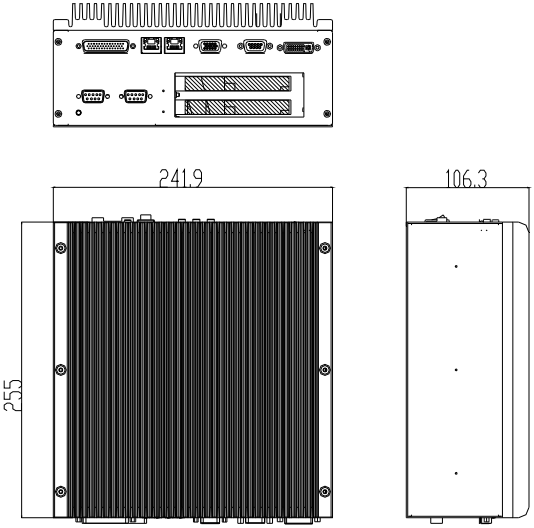


Figure 4 Upward ventilation

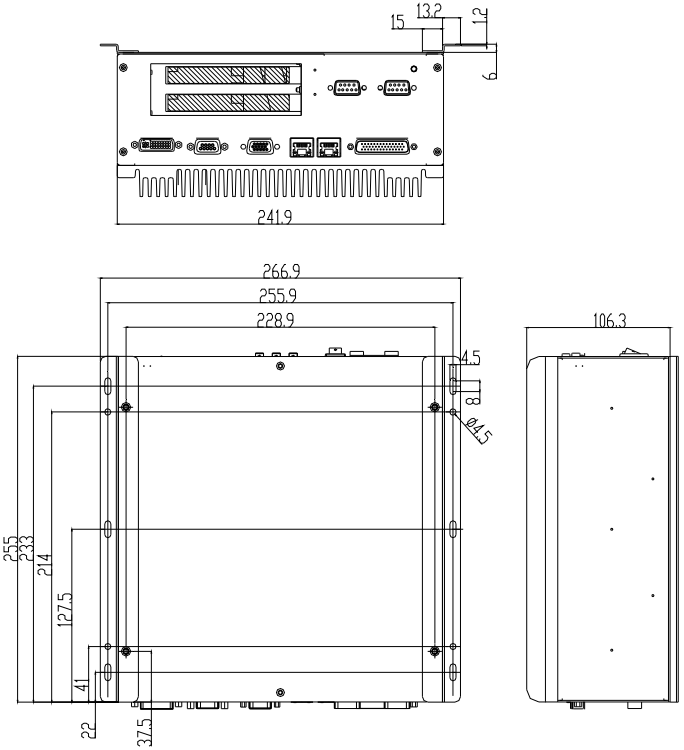
3.3 Product Dimensions Drawing



Unit: mm

3.3 Installation Dimensions

3.3.1 Installation Dimensions Drawing



Unit: mm

4. Device Connection

4.1 Notices before Connection

⚠ **Warning**
The connected or built-in peripherals with opposite polarities are not allowed.

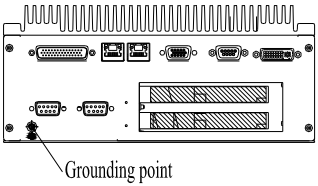
⚠ **Warning**
The device only operates when connecting with grounded power. No operation is allowed when the device power is ungrounded or only impedance is grounded.

⚠ **Warning**
Rated voltage of the device in use shall be in accord with power feature of the product.

Note:
Only the peripheral devices approved for industrial application can be used. When operating the PC, hot swappable IO modules (USB) can be used. The IO devices without hot swap function can only be connected when the PC is powered off.

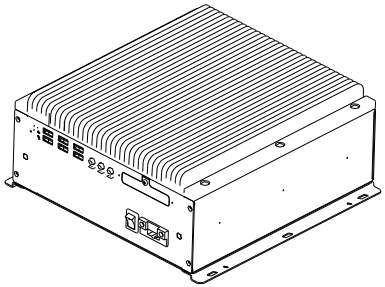
4.2 Product Grounding

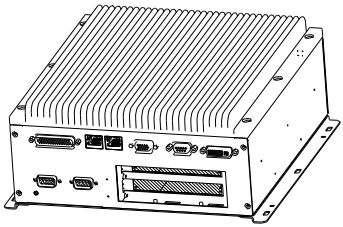
Low impedance ground connection is more helpful to release the interference produced by the external cables, the signal cables or the cables connecting the IO module to the grounding system.

Ground Terminals	
Connect the grounding cable to the ground screw. The minimum cross section area of the cable shall be no less than 5mm^2, and the maximum ground resistance shall be no more than 0.1Ω.	

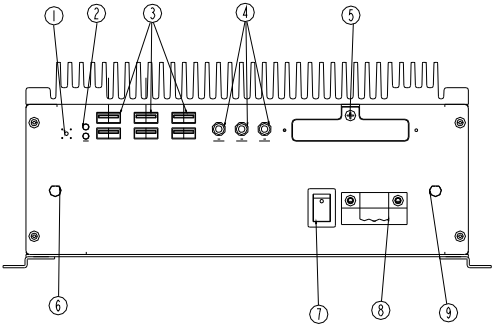
5. Operation Instructions

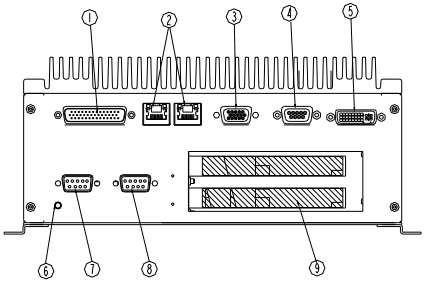
5.1 Product Outline





5.2 External Structure

Front view of the PC	Item	Description
	①	Reset button
	②	LED indicator
	③	USB 1-6
	④	Audio connector
	⑤	CF card door
	⑥	Antenna knockout hole 1
	⑦	POWER switch
	⑧	Installation position for power input terminal
	⑨	Antenna knockout hole 2

Rear View of the PC	Item	Description
	①	COM4～COM1
	②	LAN2～LAN1
	③	VGA
	④	GPIO
	⑤	LVDS
	⑥	Ground screw
	⑦	COM6
	⑧	COM5
	⑨	Expansion card

5.3 Pin Definitions

5 .3.1 LVDS Port

This board provides one single-channel 18-bit LVDS display port (output via DVI-I connector).

LVDS1

Pin	Signal Name	Pin	Signal Name
1	LVDS_D2-	13	NC
2	LVDS_D2+	14	VDD
3	GND	15	GND
4	LCD_BKLTEN	16	VDD
5	GND	17	LVDS_D0-
6	DDCCLK	18	LVDS_D0+
7	DDCDATA	19	GND
8	VDD	20	LCD_BKLTCTL
9	LVDS_D1-	21	GND
10	LVDS_D1+	22	GND
11	GND	23	LVDS_CLK+
12	NC	24	LVDS_CLK-
C1	+12V	C2	+12V
C3	+12V	C4	+12V
C5	NC	C6	NC

Note: +12V---backlight power supply (the current should be limited below 1A).

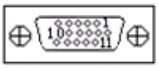
LCD_BKLTCTL--- backlight control (This signal is output directly from

Northbridge, and is PWM signal; voltage amplitude 0V—3.3V, duty cycle within 0-100%;

LCD_BKLTEN --- backlight enabling signal, active high.

5.3.2 VGA Port

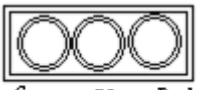
This board provides one standard DB15 VGA port. Its pin definitions are as follows:



VGA1

Pin	Signal Name	Pin	Signal Name
1	Red	2	Green
3	Blue	4	NC
5	GND	6	GND
7	GND	8	GND
9	NC	10	GND
11	NC	12	DDCDATA
13	HSYNC	14	VSYNC
15	DDCCLK		

5.3.3 Audio Ports

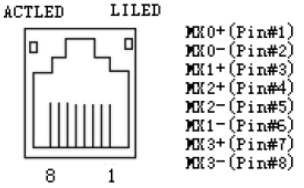


AUDIO1

Pin	Signal Name
1	LINE_OUT(green)
2	LINE_IN(blue)
3	MIC_IN(red)

5.3.4 LAN Ports

This board provides two 10/100/1000Mbps LAN ports. The pin definitions of LAN1, LAN2 are as follows:



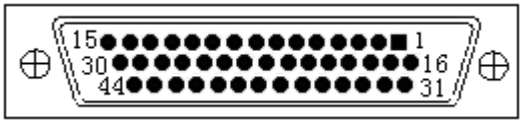
LAN1/LAN2

ACTLED (Single color: green)	LAN Activity Status Indicator		LILED (Dual-Color: orange/green)	LAN Speed Indicator
Blink	Data being transmitted		Green	1000Mbps
			Orange	100Mbps
Off	No Data being transmitted		Off	10Mbps

Note: no matter the Gigabit LAN card contains Link signal or not, the ACTLED on the left indicates the data transmission status. When data is being transmitted, the green LED on the left is "blinking"; when it is connected to network without data transmission, the green LED is "off"; when there are broadcasting packages, it is normal if the ACTLED is "blinking".

5 .3.5 COM Ports

This board provides one DB44 4-in-1 COM port, supporting four COM ports COM1～COM4. Among them, COM1/COM2 support RS-232/RS-422/RS-485 mode selection; COM3 and COM4 only support RS-232 mode. Meanwhile, the board provides two 2×5 Pin header COM port (COM5, COM6, pitch: 2.54mm), supporting RS-232 mode. Their pin definitions are as follows:



J4

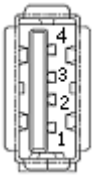
Pin	Signal Name		
	RS-232	RS-422	RS-485
1	COM1 DCD-	COM1 TXD-	COM1 Data-
2	COM1 RXD	COM1 TXD+	COM1 Data+
3	COM1 TXD	COM1 RXD+	NC
4	GND	GND	GND
5	COM2 DCD-	COM2 TXD-	COM2 Data-
6	COM2 RXD	COM2 TXD+	COM2 Data+
7	COM2 TXD	COM2 RXD+	NC
8	GND	GND	GND
9	COM3 DCD-	COM3 DCD-	COM3 DCD-
10	COM3 RXD	COM3 RXD	COM3 RXD
11	COM3 TXD	COM3 TXD	COM3 TXD
12	GND	GND	GND
13	COM4 DCD-	COM4 DCD-	COM4 DCD-
14	COM4 RXD	COM4 RXD	COM4 RXD
15	COM4 TXD	COM4 TXD	COM4 TXD
16	COM1 DTR-	COM1 RXD-	NC
17	COM1 DSR-	NC	NC
18	COM1 RTS-	NC	NC
19	GND	GND	GND
20	COM2 DTR-	COM2 RXD-	NC
21	COM2 DSR-	NC	NC
22	COM2 RTS-	NC	NC
23	GND	GND	GND
24	COM3 DTR-	COM3 DTR-	COM3 DTR-
25	COM3 DSR-	COM3 DSR-	COM3 DSR-
26	COM3 RTS-	COM3 RTS-	COM3 RTS-
27	GND	GND	GND
28	COM4 DTR-	COM4 DTR-	COM4 DTR-
29	COM4 DSR-	COM4 DSR-	COM4 DSR-
30	COM4 RTS-	COM4 RTS-	COM4 RTS-

31	COM1_CTS-	NC	NC
32	COM1_RI-	NC	NC
33	GND	GND	GND
34	GND	GND	GND
35	COM2_CTS-	NC	NC
36	COM2_RI-	NC	NC
37	GND	GND	GND
38	GND	GND	GND
39	COM3_CTS-	COM3_CTS-	COM3_CTS-
40	COM3_RI-	COM3_RI-	COM3_RI-
41	GND	GND	GND
42	GND	GND	GND
43	COM4_CTS-	COM4_CTS-	COM4_CTS-
44	COM4_RI-	COM4_RI-	COM4_RI-

Note: Under the RS-485 mode, the data receive/send direction is controlled automatically.

5.3.6 USB Port

This board provides six USB 2.0 ports. Their pin definitions are as follows:

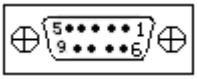


J1、J2、J3（USB1～USB6）

Pin	Signal Name
1	+5V
2	USB_Data-
3	USB_Data+
4	GND

5.3.7 GPIO Port

This board provides one 8-channel GPIO DB9 female connector, with electronic switch isolation design. Its pin definitions are as follows:



GPIO1

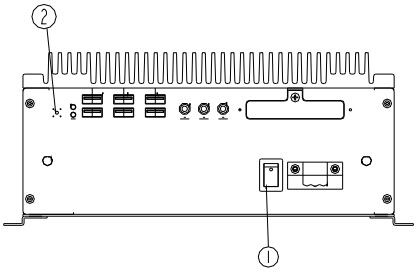
Pin	Signal Name	Pin	Signal Name
1	GPIO1	6	GPIO6
2	GPIO2	7	GPIO7
3	GPIO3	8	GPIO8
4	GPIO4	9	GND
5	GPIO5		

Note: By the factory default, pin 1, 3, 5 and 7 are for input while pin 2, 4, 6 and 8 are for output.

5.4 Operation Control

⚠Warning
The On/Off button signal will not disconnect PC power supply!

⚠Caution
When the PC executes hardware reset, data may be lost.

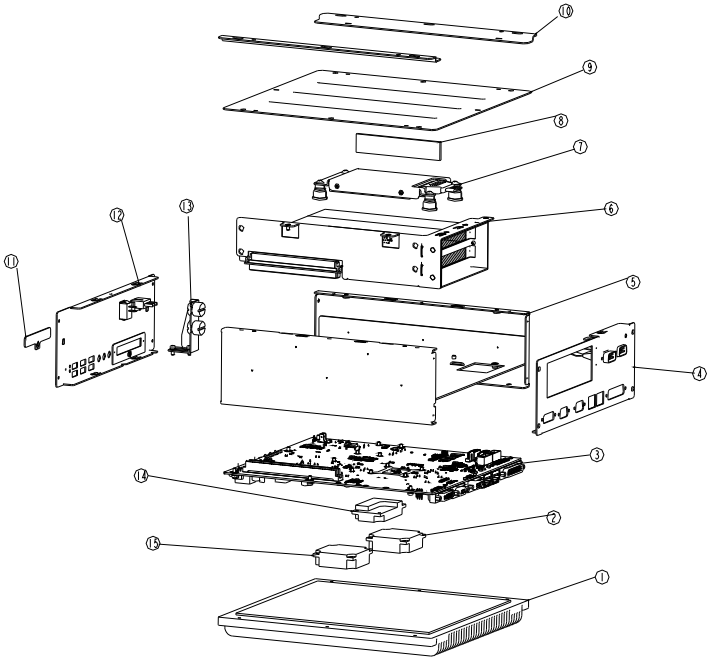
Control Button	Item	Description
	①	When power in connected, it is used to boot up the PC.
	②	Reset button When the PC breaks down, use this switch to reset the PC (cold boot).

5.5 Status Indicators

Display	Meaning	LED	Description
POWER	Displaying PC status	Off	The PC is not operating
		On	PC is operating
HDD	Displaying hard drive status	Off	No access
		On	Being accessed

6. Assembly and Maintenance

6.1 Overall Assembly Drawing

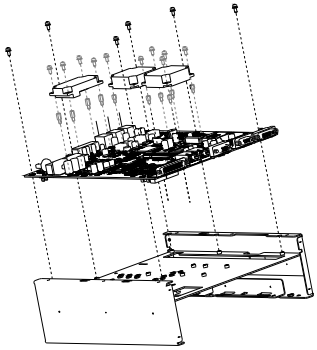


Item	Description	Item	Description	Item	Description
1	Chassis cover	2	CPU heat sink	3	Motherboard
4	Rear panel	5	Butt-weld assembly of main bracket	6	Expansion card module
7	HDD module	8	Impact-proof foam for HDD	9	Bottom cover
10	Wall mount bracket X2	11	CF card cover	12	Front panel
13	Pressure pad bracket for expansion card	14	Power supply heat sink	15	PCH heat sink

6.2 Installation and Removal of Motherboard

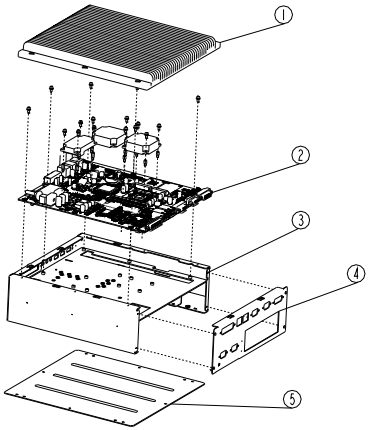
6.2.1 Installing the Motherboard

Use 6PCS pan head combo screws M3*6 to fasten the board on the butt-weld assembly of main bracket, then use 4PCS M3*8 and 6PCS M3*5 hexagon screws to fasten power supply/CPU and PCH heat sinks.



6.2.2 Removing the Motherboard

Loosen 3PCS screws fixing the chassis cover①, loosen 8PCS screws fixing the bottom cover⑤, loosen 6PCS screws and 10PCS hexagon screws fixing the motherboard② and butt-weld assembly of main bracket③, remove the rear panel④, then the motherboard can be removed.



6.3 Installation and Removal of HDD

This chassis is configured with 2.5-inch HDD. The HDD module is composed of HDD bracket and 4PCS shock absorption pads. Use 4PCS M4*6 cup head screws to fasten it onto the butt-weld assembly of main bracket.

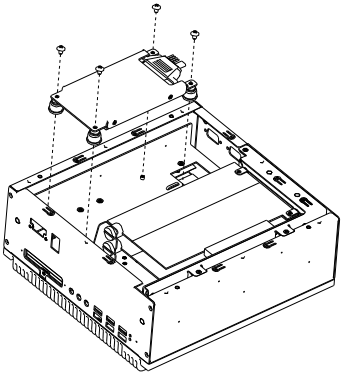


Figure 1

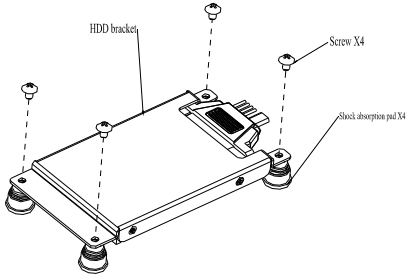
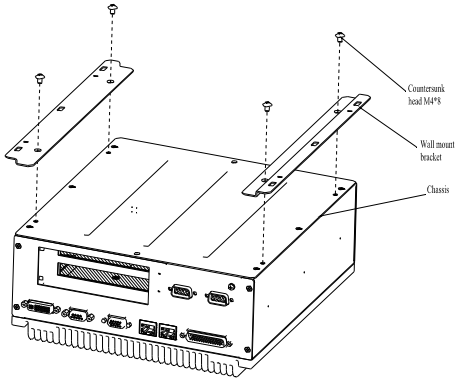


Figure 2

6.4 Installing the Wall Mount Bracket

The two wall mount brackets can be fastened by 2PCS countersunk head M4*8 screws.



6.5 Installing the Expansion Card Module

Installation instructions for expansion card module: The expansion card module can be directly inserted or pull out. Firstly, fasten the PCI expansion card onto the expansion card module, tighten the screws fixing the bracket, then insert the pin header of expansion card module into the corresponding connector of the motherboard, finally, use 3PCS countersunk head screws to fasten it with the butt-weld assembly of main bracket of the chassis.

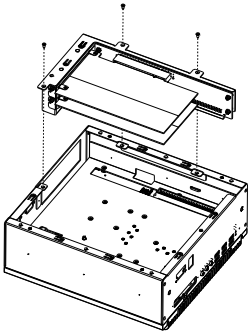


Figure 1

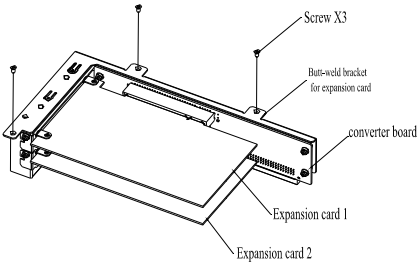


Figure 2

6.6 Installing CF Card

The CF card door adopts ergonomic design. It is composed of three parts: hex taps screw, CF card door and PC pad. With the PC pad, the hex taps screw will not break away from the CF card door, which is convenient for user's operation.

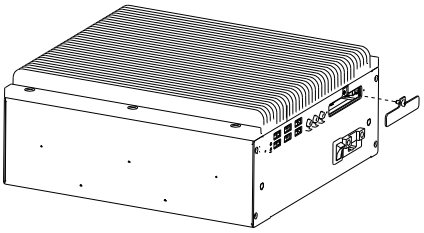


Figure 1

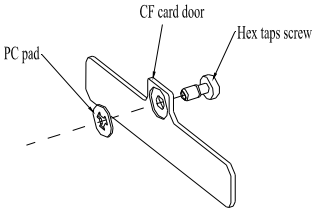


Figure 2

6.7 Pressure Pad for Expansion Card

This chassis supports two-layer expansion cards, full-size and half-size cards. The pressure pads for expansion card provide support from two directions. For full-size cards, the support is on the right side of the expansion card; for those between full-size cards and half-size cards (including half-size cards), the support is right on the position of gold finger. For each of these two directions, there are three groups of nuts on the butt-weld assembly of main bracket, and the position of the screws can be adjusted. Install the expansion card module onto the chassis, select proper position according to the height of users' expansion card, then use 2PCS screws to fasten the pressure pads for expansion card.

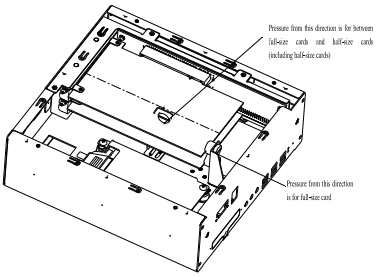

Pressure from this direction is for between full-size cards and half-size cards (including half-size cards)
Pressure from this direction is for full-size card

Figure 1

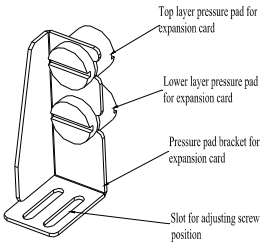

Top layer pressure pad for expansion card
Lower layer pressure pad for expansion card
Pressure pad bracket for expansion card
Slot for adjusting screw position

Figure 2

7. Installing the Drivers

Regarding the installation of the driver program and the detailed information of the motherboard, please refer to the enclosed CD of the PC.

8. Appendix

8.1 Troubleshooting and Solutions

Common Malfunctions	Possible Reasons	Troubleshooting and Solution
The device is not operating	No power supply	Please check the power supply and the power cable/connector.
	Improper device operating environment	1. Check the environment conditions; 2. Please wait for twelve hours before powering on the device shipped in cold weather.
The external display is black	The display has not been turned on	Turn on the display
	The display is under "power saving" mode	Press any key on the keyboard.
	The luminance control is set to "Black".	Increase the screen luminance by luminance control. Please refer to the instructions of the display for detailed information.
	Power cable or display cable is not connected	1. Please check whether the power cable is correctly connected with the display, the system unit or the ground port. 2. Please check whether the display cable is correctly connected with the display and the system unit. 3. Contact Technique Support if the screen remains black after implementing the above measures.
Incorrect time or date on PC	Incorrect BIOS setting	Follow the power-on prompt and press the key to enter the BIOS Setup; adjust the time and date in BIOS Setup.

BIOS setting is correct while the time and date are incorrect.	Insufficient backup battery capacity	Replace the battery
USB device has no response	USB port is disabled in BIOS	Use other USB ports or enable that port.
	USB 2.0 device is connected; however, USB 2.0 is disabled.	Enable USB 2.0.
	USB port is not supported by the operating system.	1. Enable USB Legacy Support for the mouse and keyboard (Legacy USB is supported); 2. For other devices, appropriate USB drivers are required.
The computer is not booted or displays "Boot device not found"	In booting priority of the BIOS setting, the device is not the first priority or the device is not include in the booting device.	Modify the booting priority of the device in the Boot menu of BIOS setting or include that device into the booting priority.
No system disk can be found when powering on	The HDD power cable or data cable is not connected well	Check whether the power cable and the data cable of the hard disk (the hard disk shall be installed with operating system and is bootable) are well connected.
	System files on the hard disk are damaged	Enter the system (usually WinPE system) with a bootable disk; check whether the system in the hard disk is damaged. Reinstall the system if necessary.

Plug and play I/O card, no IO card is detected or no IO card can be used when used again	Poor contact of the slot	Poor contact is usually caused by frequent installation/ uninstallation of the PCI or ISA card, unstable fixing or improper dust-proof measures; please remove and install the card for a few times or use another slot.